Reference Manual for the

MathMaster™

Educational Calculator

a product of

Stokes Publishing Company

Sunnyvale, CA

MathMaster **Key List**

CE/C	Clear entry, clear
0-9, •	Numeric input
+ − x ÷	Operations
=	Result
M+	Add to memory
M−	Subtract from memory
MRC	Memory recall, memory clear
RESET	Clears decimal fix and all pending operations
+/−	Toggles sign of dispayed number
%	Percent
√	Square root

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Welcome to the exciting world of the MathMaster calculator. You will be using the "world's finest four-function calculator," the only one with the patented feature, the Key Eliminator. To take full advantage of the many features and functions of the MathMaster, go through this manual with MathMaster in hand following the explanatory sequences. Most sequences contain single-digit numbers so you can concentrate on the process rather then on cumbersome computations. You will then gain the confidence and know-how to use the MathMaster to perform difficult computations with speed and accuracy.

Exciting Features of the *MathMaster*

- **Eliminator**
  This new, patented function will allow the user to disable or make inactive one or more keys.
- **Constants**
  The MathMaster has full constant capability for all four operations. A counter showing in the display indicates the number of times the constant has been used.

- **Fixing the Number of Decimal Places**
  The decimal point may be fixed to a designated number of places, from 0 to 7.
- **RESET**
  Pressing the RESET key will reactivate any keys that have been disabled and return the calculator to floating decimal point notation. All constants, pending operations, and contents of memory will be cleared.
- **Operation Icons**
  Icons for the operations of addition, subtraction, multiplication, and division will appear on the right side of the display in a large five-by-five dot matrix to indicate what operation is being processed or is pending.
- **Logic System**
  All operations are processed according to the standard algebraic order of operations (MDAS).
- **Reading Large Numbers**
  Large numbers in the display are easy to read. The periods of a large number are separated with an apostrophe at the top of the number.

Guide to Display Symbols

The display holds up to eight digits. In addition, there are indicators which will appear in the display to alert you to the status of the various features and functions of the MathMaster.

Indicator	Description	Page
,	Separates large numbers into periods	4
+	Operation of addition in progress or pending	4
−	Operation of subtraction in progress or pending	4
×	Operation of multiplication in progress or pending	4
÷	Operation of division in progress or pending	4
E (error)	Calculation resulted in error; or display or memory exceeded	7
M	Non-zero number is stored in memory	10
FIX	The number of decimal places is fixed at 0 to 7 places.	14
•	Eliminator feature is in effect.	15

Key Functions

CE/C, Digit keys and =

Press CE/C to turn on the calculator. You should have a "0" in the display.

To display 12, press 1 2.
Clear the display by pressing CE/C.
To display 21, press 2 1.
Clear the display by pressing CE/C.
To display 3'287'914, press 3 2 8 7 9 1 4. Note the apostrophes at the top of the display separate this seven-digit number into periods of three for ease of reading.
Clear the display by pressing CE/C.

Press 5 + 3 =. Display 8. Notice that when the addition key was pressed, the addition icon appeared on the right side of the display.

Press 9 − 2 =. Display 7. Notice that it was not necessary to clear the display. If the = key is pressed between separate calculations, you do not have to clear the display.

Use CE/C to clear a numerical input error.

Press 6 + 7 'Erase" the 7 by pressing CE/C 4 =. Display 10 (6 + 4).

Press CE/C to clear the current number in display.
Press 6 + 7 CE/C CE/C. Display 0. The addition calculation has been cleared, as well as both arguments.

Press CE/C to clear errors. Key in 99,999,999.
Press + 1 =. The display shows the error indicator. The sum exceeds the display's 8-digit capacity. Press CE/C. Display 0. The error has been cleared.

Round Off

The MathMaster performs precise calculations with a round-off feature. Press 2 ÷ 3 =. The right-most digit is a 7. The rounded-off decimal equivalent for 2/3 is displayed. Press x 9 =. Display 6 (2/3 x 9).

Logic System

All operations are processed according to the standard algebraic order of operations.
For 2 x 3 + 5, press 2 x 3 + 5 =.
Display 11.
For 5 + 2 x 3, press 5 + 2 x 3 =.
Display 11.

For 4 x 5 + 3 x 2, press
4 x 5 + 3 x 2 =. Display 26.
For 4 x (5 + 3 x 2), press
5 + 3 x 2 = x 4 =. Display 44.

Constant Operations

Use the constant feature to repeatedly operate with the same number.

Example	Press	Display
Use 4 as a constant.	RESET or CE/C	0
2 + 4, 5 + 4,		
7 + 4, 9 + 4	2	2
	+	2 [+]
	4	4
2 + 4	=	6
	5	5 [+]
5 + 4	=	9
	7	7 [+]
7 + 4	=	11
	9	9 [+]
9 + 4	=	13

Example	Press		Display
	RESET or CE/C		0
10 x = = = = =	10		10
	x	**Counter**	10 [x]
10 x 10	=	2	100
10 x 10 x 10	=	3	1000
10 x 10 x 10 x 10	=	4	10000
10 x 10 x 10 x 10 x 10	=	5	100000

Notice that the counter shows the number of times the entered number is used as a factor.

Example	Press		Display
	RESET or CE/C		
2 + 3 = = = = =	2		2
	+		2 [+]
	3		3
2 + 3	=	**Counter**	5
2 + 3 + 3	=	2	8
2 + 3 + 3 + 3	=	3	11
2 + 3 + 3 + 3 + 3	=	4	14

Notice that the counter, starting at 2, indicates the number of times the constant (3) is being used as a addend.

Memory Keys

The three memory keys allow the user to store, add to, subtract from, recall, and clear numbers in memory.

M+ Adds displayed number to memory. (memory indicator active)

M– Subtracts displayed number from memory. (memory indicator active)

MRC Pressed once, recalls memory to display. (memory indicator active)
Pressed twice, clears memory. (memory indicator not displayed)

Press [4] [+] [5] [=] Display 9.
Press [M+]. The displayed number is stored in memory.

The display now has an "M" in the left-hand corner of the display. This indicator tells the user that a non-zero number is stored.

Press [CE/C]. Display 0. The memory indicator is still present.

Press [MRC]. Display 9.

Press [MRC]. Display 9. The "M" symbol disappears.

Press [4] [M+] [M+] [M+] [MRC]. Display 12.

Press
MRC MRC 2 x 3 = M+ 4 x 5 =
M+ MRC. Display 26

Press
MRC MRC 3 x 7 = M+ 2 x 8 =
M− MRC. Display 5

Percent Key

Press 2 5 %. Display 0.25
(assumes 25% of 1)
To find 25% of 60, press
2 5 % x 6 0 =. Display 15

To find 60 multiplied by 25%, press
6 0 x 2 5 % =. Display 15

Discount and Markup

An item that sells for $80 is discounted 25%.
What is the sale price?

Press	Display
80	80
–	80 [–]
25	25
%	20
=	60

The sale price is $60.

A dress costing $120 is to be marked up an additional 20%. What will be the new price?

Press	Display
120	120
+	120 [+]
20	20
%	24
=	144

The new price for the dress is $144.

A VCR selling for $250 is to be discounted 40%. What will the VCR cost including a 6% sales tax?

Press	Display
250	250
–	250 [–]
40	40
%	100
=	150
+	150 [+]
6	6
%	9
=	159

The total cost of the VCR, including tax is $159.

Mr. Palko made a 15% commission on April sales of $12,500 and 24% commission on June sales of $9,250. What was the total of his two-month commissions?

Press	Display
12500	12500
x	12500 [x]
15	15
%	0.15
=	1875
M+	1875 [M]
9250	9250

Press	Display
x	9250 [x]
24	24
%	0.24
=	2220
M+	2220 [M]
MR	4095

Mr. Palko's total two-month commission was $4095.

Change Sign Key

This key finds the opposite or additive inverse of the displayed number.
To display the opposite of 5, press [5] [+/–].
Display -5.
To display the opposite of 237, press
[2] [3] [7] [+/–]. Display -237.
To display the opposite of 19, press
[1] [9] [+/–]. Display -19.
Notice that the negative sign floats depending on the number of digits.

Square Root Key

To find the square root of 49, press
[4] [9] [√]. Display 7
To find the square root of 12.25, press
[1] [2] [•] [2] [5] [√]. Display 3.5
Press [x] [=]. Display 12.25

Fixing the Number of Decimal Places

To change from a floating decimal mode to a designated number of places, hold down the decimal point key for three seconds. A range, 0-7, and the *FIX* icon appears in the display. Press 2 for two-decimal place mode;

0.00 will be displayed. Use a two-place mode when working with money. If 8 or 9 is entered following the 3-second interval, the display will return to the floating-decimal point mode. Pressing RESET also returns the display to the floating-decimal point mode.

Key Eliminator

This new, patented feature allows the user to disable one or more keys by holding down one key at a time for a period of 3-4 seconds. The user will then be unable to use the number or operation that was eliminated. A large black dot will appear in the left-hand portion of the display indicating that this feature has been activated. When RESET is pressed, all disabled keys are once again active. The folllowing keys cannot be disabled: [CE/C], [MR], [M+], [M−], [=], and [•]. This feature provides opportunities for the user to explore mathematics. Here is an example: Hold down the [√] key for 3-4 seconds. You have now disabled this key. Use a "guess and check" method to find the square root of 28 correct to two decimal places.

Notes on Percentages

A percentage must always relate to a fractional part of something. A statement like "25%" is meaningless unless it is known what the whole is. 25% of 40 is 10. 25% of 1,000 is 250, etc.

In the MathMaster, the percent key operates in two ways, depending upon whether its use follows an add or subtract operation, or a multiply or divide operation. It is important to understand this distinction when using this calculator (or any other calculator, for that matter, since different calculators process percentages in different ways).

In add-on and discount problems, the calculator always assumes the first number entered as the whole, of which it finds the requested percentage. It then displays that fractional part and uses it as the second number which is then either added to or subtracted from the first number (depending on whether it follows an add or subtract operation) when the equals key is pressed. When % is used following a multiply or divide operation, the MathMaster assumes the whole to be 1; therefore pressing 16%

will result in a display of 0.16. In the problem of 40 x 16%, the first number, 40, is multiplied by the second number, 0.16 (16% of 1) to arrive at a result of 6.4, which is consistent with the idea of "16% of 40."

When none of the operations (+, –, x, ÷) are pending, and % is used following a number entry, MathMaster assumes that percentage of 1. For example, if the problem sequence, 24% + 3, is keyed into the calculator, the result will be 3.24 when the equals key is pressed.

Changing the Calculator Identification Numbers

The MathMaster's unique identification system consists of two number wheels back-to-back inside the back case; one transparent wheel and one opaque wheel. Identification (ID) numbers may be set from 00 to 99. Sets of calculators are shipped with preset ID numbers from 1 to 30 in order to relieve the teacher of the task of setting them. However, if you purchase fewer than 30 calculators, you may receive some with duplicate ID numbers, or some that duplicate the ID

numbers of your existing MathMasters. To set or change ID numbers, you must open the calculator and rotate the number wheels so that the desired digits are visible throught the ID window. A small philips screwdriver is required. Read each step all the way through before accomplishing it.

1. With the MathMaster face down, remove the four screws securing the back case.

2. Remove the back case by lifting and rotating it to the left, and placing it back-side down next to the main case (see figure A).

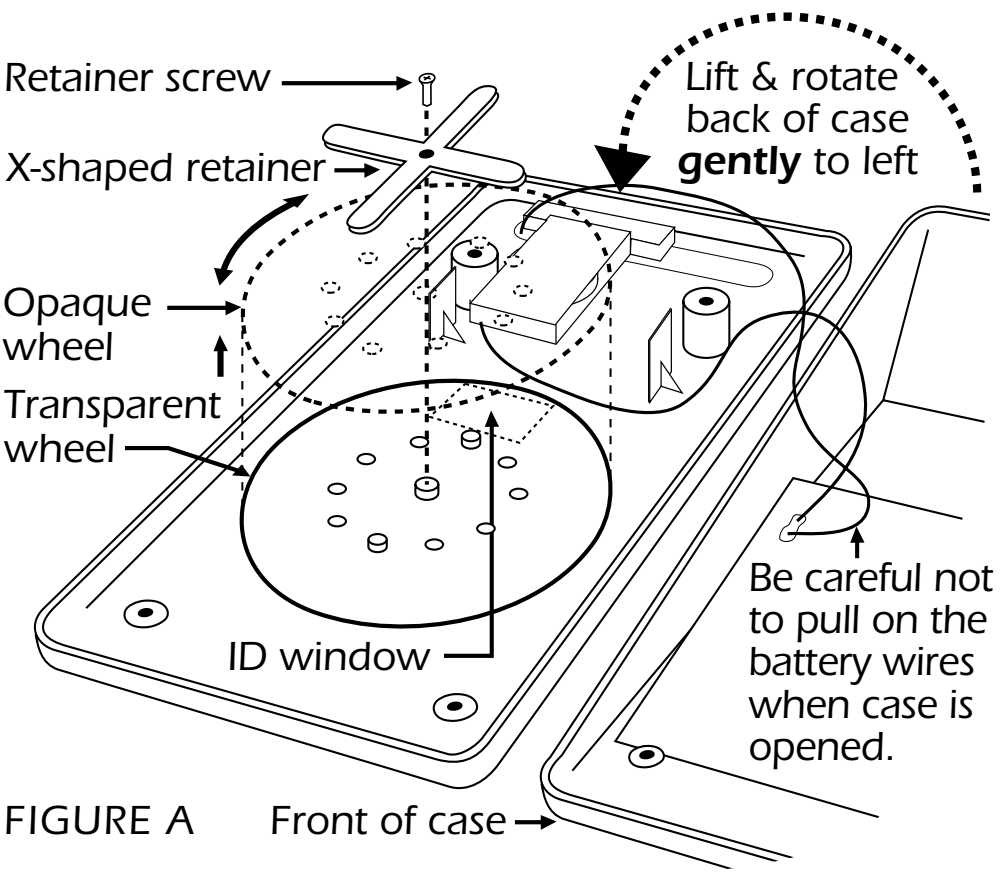
Retainer screw
X-shaped retainer
Opaque wheel
Transparent wheel
ID window
Lift & rotate back of case **gently** to left
Be careful not to pull on the battery wires when case is opened.
Front of case

FIGURE A

Note: Be careful not to break the two wires that attach the battery to the circuit board.

3. Locate the ID wheels in the back case and remove the screw from the X-shaped retainer. Lift the retainer free from the alignment holes in the case. Set the screw and the retainer aside.

4. Lift both wheels and rotate each one so that the desired numbers will be visible through the ID window. Replace the wheels by aligning the holes in the wheels so that they fit over the raised guide posts in the case. Check to see if the desired numbers are visible through the ID window.
Note: Be sure the transparent wheel is positioned closest to the case with the opaque wheel on top.

5. When the desired numbers appear in the window, replace the X-shaped retainer by aligning the two pins on the bottom of the retainer with the small holes in the wheel alignment guides. Press gently into place.

6. Install the retainer screw. Do not over-tighten.

7. Replace the back case and install the four screws. Be sure that no wires are pinched by the case edges when the screws are tightened. Tighten the screws snugly but do not over-tighten as this could strip the plastic threads.

Battery Replacement

The MathMaster is designed to operate for an average of five years on the factory-installed battery. When the display becomes too dim to read, the battery should be replaced with a CR2032 or equivalent battery available wherever watch or calculator batteries are sold.

Please read each step completely before accomplishing it. A small phillips screwdriver is required.

1. With the MathMaster face down, remove the four small screws securing the back case.

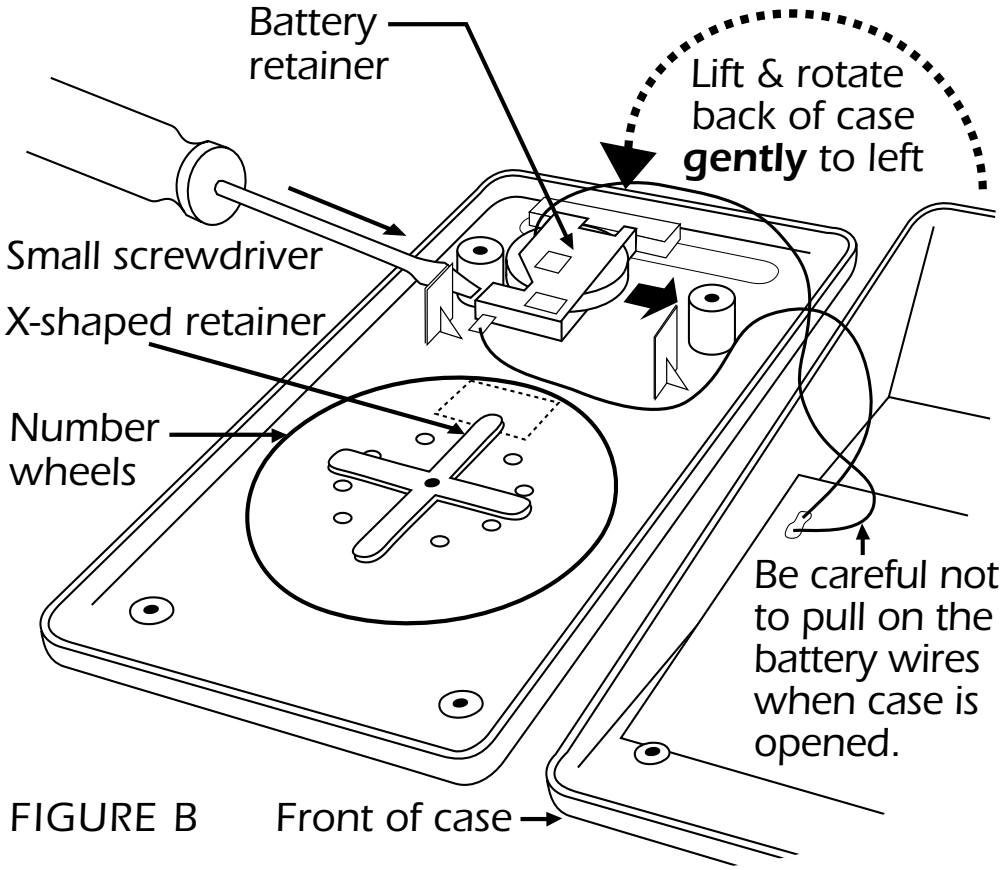
Battery retainer
Lift & rotate back of case **gently** to left
Small screwdriver
X-shaped retainer
Number wheels
Be careful not to pull on the battery wires when case is opened.
Front of case

FIGURE B

2. Remove the back case by lifting it and rotating it to the left, and placing it back-side down next to the main case. (see figure B). Be careful not to break the two wires that attach the battery to the curcuit board.

3. Locate the battery and battery retainer. **Do not remove the battery retainer screws.**

4. Inserting a small screwdriver or similar instrument from the left side near the

large post, gently push against the side of the battery until it snaps out of its retainer. Be careful not to break the wires connected to the battery contacts. Lift the old battery out and set it aside.

5. Install the new battery with Plus (+) side up by placing it just to the right of the battery retainer. Using a finger, carefully press the battery toward the left, back into the retainer until it snaps into place.

6. Replace the back case and install the four screws. Be sure that the wires are not pinched in the edge of the case. Tighten the screws snugly; overtightening could result in stripping the plastic threads.

7. Insure that the calculator works by turning it on and observing the display.

Do not dispose of the old battery by fire. It could explode.

One Year Limited Warranty

The MathMaster calculator is warranted against defects of workmanship and materials for one year from the date of original purchase by the user from Stokes Publishing Company or an authorized SPC dealer. Should the calculator malfunction under normal use during the warranty period, return it to SPC (postage paid) for repair or replacement at SPC option.

The warranty is void if the calculator is damaged by accident, unreasonable use, negligence, or other causes not due to defects in workmanship or materials.

Disclaimers: Any implied warranties, including, but not limited to, the implied warranties of merchantability and fitness of use, are limited to the one-year duration of this warranty. SPC shall not be liable for the loss of the calculator, or other incidental or consequential damages, expenses or costs arising from the use of this calculator.

Some states do not allow exclusions or limitations of implied warranties or consequential damages; therefore the above limitations or exclusions may not apply to you.

Remedies: This warranty gives you specific legal rights, and you may have other rights that vary from state to state.

STOKES PUBLISHING COMPANY

1292 Reamwood Avenue
Sunnyvale. CA 94089
Phone (408) 541-9145 ▪ Fax (408) 541-9149

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